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The Relationship of Birth Order to Self-Evaluation, Anxiety Reduction, and Susceptibility to Emotional Contagion

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THE RELATIONSHIP OF BIRTH ORDER TO SELF-EVALUATION, ANXIETY REDUCTION, AND SUSCEPTIBILITY TO EMOTIONAL CONTAGION[1]

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A $2 \times 2 \times 2$ factorial experiment was performed to test the following hypothesis: 1st-born individuals have a greater need for both self-evaluation and anxiety reduction than later borns. The experimentally manipulated variables were: (a) opportunity for anxiety reduction and (b) ease of self-evaluation. 64 female undergraduates served as Ss (with an additional 32 in control conditions), of which half were first born, half later born. The experiment provided strong evidence that the need for self-evaluation was greater for 1st borns but suggested that later borns have a greater need for anxiety reduction. A developmental theory which attempts to integrate findings relating to birth order, motivation, and social behavior was presented.

Ever since Schachter (1959) reported some surprisingly strong relationships between ordinal position of birth and affiliative behavior, we have witnessed a resurgence of interest in the correlates of birth order (e.g., Becker & Carroll, 1962; Connors, 1963; Dittes, 1961; Gerard, 1963; Gerard & Rabbie, 1961; Glass, Horwitz, Firestone, & Grinker, 1963; Sampson, 1962; Sarnoff & Zimbardo, 1961; Schachter 1963, 1964; Smart, 1963; Staples & Walters, 1961; Zimbardo & Formica, 1963). While many of these studies have certainly been intriguing, there characteristically is no more than a perfunctory attempt to formulate an ad hoc "theory" to "account for" the results. Thoughtful conceptual work has been rare (there are, of course, exceptions to this generalization, e.g., Zimbardo & Formica, 1963). The purpose of the studies to be presented below was to test some specific assumptions of a theory relating birth order to certain psychological and social variables. In this section, we shall be concerned only with these assumptions and the evidence on which they are based. After the data have been considered, we shall spell out the theory in detail.

In his monograph, Schachter (1959) was concerned primarily with the determinants of affiliative behavior under conditions of experimentally induced anxiety. He concluded, after a series of laboratory studies, that there were two principal motivational factors to which this kind of behavior could be ascribed, viz., the need for direct anxiety reduction and the need for self-evaluation. Concerning the former, Schachter (1959) comments:

> People do serve a direct anxiety-reducing function for one another. They comfort and support, they reassure one another and attempt to bolster courage . . . it is possible that highly anxious subjects chose "Together" as a means toward this sort of social reassurance and toward reducing anxiety [p. 26].

As for self-evaluation, Schachter (1959) writes:

> One may use other people to evaluate his emotions and feelings. In a novel, emotion-producing situation, unless the situation is completely clear-cut the feelings one experiences or "should" experience may not be easily interpretable, and it may require some degree of social interaction and comparison to appropriately label and identify a feeling. We are suggesting, of course, that the emotions are highly susceptible to social influence and that . . . a need for social evaluation of the emotions may be active [p. 26].

Schachter's work has, of course, generated criticism as well as research. For example, Rabbie (1963) has questioned the

[1] This research was supported by a University of Connecticut Research Foundation Grant (No. 94) to the senior author.

importance of certain motivations which Schachter had, to his satisfaction, ruled out; Gerard and Rabbie (1961) have expressed reservations concerning the methods used to demonstrate the presence of a need for self-evaluation; and Zimbardo and Formica (1963) have quarreled with Schachter's theorizing about his ordinal position effects. In view of such critical commentary, it is surprising to learn that the principal experimental study which seems to furnish the only positive evidence for Schachter's final conclusion, one conducted by Wrightsman (1960), has yet to be carefully scrutinized. Since this investigation is the starting point for the research reported below, it will be helpful to review Wrightsman's experiment at some length.

Wrightsman created three experimental conditions in each of which subjects were exposed to an anxiety-arousing manipulation. In the "alone" conditions, *S*s (subjects) filled out a questionnaire item relating to felt anxiety immediately after receiving the manipulation, waited by themselves for 5 minutes, then again responded to the same questionnaire item. In the "together–no talk" condition, after the prewaiting period anxiety measure, *S*s were brought together in groups of four for an interval of 5 minutes after which they again indicated their level of anxiety. The *S*s in this condition were instructed not to talk to one another during the waiting period. The "together–talk" condition was identical except that *S*s were encouraged to talk.

As for the expected findings, Schachter (1959), in describing this experiment, makes the following argument:

> If the presumed anxiety-reducing property of group membership is a potent determinant of the choice of "Together" (i.e., wanting to affiliate), it should be anticipated that being with others will actually reduce anxiety [p. 103].

This is obviously a plausible, though not a logical, assertion. Clearly, simply because a need is operative, it does not follow that group interaction will necessarily gratify it. Gratification of the need, as Schachter (1959, p. 112) elsewhere notes, depends on the nature of the group interaction, not merely on the fact that group interaction occurs.

Ignoring birth-order differences, Wrightsman failed to find that anxiety was reduced to a greater extent in the together conditions. However, he was able to show that a significantly greater decrement in anxiety did occur for first-born *S*s in the together conditions, as compared to the alone condition. Necessarily, in view of the overall finding, no such trend was evident for later borns. Thus, there are data consistent with the hypothesis that the need for anxiety reduction is a determinant of affiliation under conditions of anxiety arousal, but only for first-born individuals.

Wrightsman's experiment, however, was designed also to provide data concerning the need for self-evaluation as a source of affiliative behavior. Again, let us quote Schachter (1959) on this point:

> If evaluative needs are major determinants of the relationship between anxiety and affiliation, it should be anticipated that being with others will lead to homogeneity of emotional intensity among the group members.... This expectation derives from the set of assumptions [those of Festinger's, 1954, social comparison theory]...which indicate that social evaluation is possible only when there is relative homogeneity among the members of a reference group. Assuming evaluative needs and granting a situation in which evaluation is possible only through social comparison processes, it follows from the above that if discrepancies exist among group members, pressures will arise to reduce such discrepancy [p. 103–104].

It may indeed follow, according to theory, that where discrepancies exist pressures will be set up to reduce them, but such an assumption does not logically demand that a group, subject to such pressures, will become more homogeneous in emotional intensity, as Schachter proposes. For that to happen, these pressures toward uniformity of emotion would have to exert a significant effect on the group, an occurrence which clearly depends, once more, on the nature of the group interaction and the forces which govern it. A person may be hungry, but that doesn't mean he will eat; it means only that he should make attempts to eat. It is clear, we think, that Schachter's arguments concerning both anxiety reduction and self-evaluation suffer

from the same logical flaw, viz., the hidden assumption that the existence of a motivation requires its satisfaction. In the present context, it is obvious that Schachter would not want to conclude, if no tendencies toward emotional homogenization should be observed, that the need for self-evaluation was not operative, but merely that the conditions of group interaction were not such as to gratify it.

Wrightsman, in fact, did find evidence for significantly greater homogenization of emotional intensity in the together conditions, thus supporting a self-evaluation interpretation. Nevertheless, there remains a certain ambiguity concerning some of the implications of Wrightsman's data, especially in regard to the self-evaluation hypothesis.

To take a minor point first, the index of homogenization used by Wrightsman consisted of the following fraction: the range of anxiety scores after the 5-minute waiting period over the range of scores before this period. Any fraction less than 1 would then be taken as indicative of increasing uniformity of emotional state. Why a range measure was employed instead of a similar ratio based on the standard deviation of anxiety scores is not clear. Surely the latter would have been preferable since it takes into account all the data and not just those of the two extreme individuals of each group and is, therefore, a more sensitive indicator of emotional homogeneity.

Another difficulty in interpreting these data as favorable to a self-evaluation interpretation stems from the finding that the index of homogenization is in part artifactual due to the fact that anxiety generally declines over time. Since there is a tendency for scores to move toward zero—the floor of the scale—homogeneity will necessarily be brought about as a function of general anxiety-reduction tendencies. Actually, the correlations between the index of homogeneity and anxiety reduction were .57 ($p < .02$) for the together–no talk condition and .31 (n.s.) for the together–talk condition. Thus, there is some evidence that the index used is by no means a "pure" measure of self-evaluative motivations.

Finally, Wrightsman presents no evidence concerning the relative influenceability of emotional states of first-born and later-born *S*s. This is surprising indeed because everything in Schachter's monograph would suggest that first borns should be more responsive and more likely than later borns to move toward the perceived modal anxiety level of the group. Such a finding would have been strong evidence in support of greater tendencies toward self-evaluation in first borns and would be highly consistent with his affiliation data. This point is important and deserves some amplification.

With respect to ordinal position, Schachter's principal finding is that first-born individuals want to affiliate when afraid; later borns do not especially or at least are more indifferent about affiliation under anxiety-arousing conditions. On the basis of Wrightsman's experiment, Schachter asserts that there are two main reasons why people affiliate when afraid: they want anxiety reduction and/or self-evaluation. But since it is largely first borns who want to affiliate in the first place, it is necessary to show specifically that *they* have these needs, or, at least, that they have stronger needs in this regard than later borns. There are some confirmatory data concerning anxiety reduction, but, as we have indicated, there is no direct evidence from Wrightsman's experiment that first borns exceed later borns in the need for self-evaluation. Thus, a crucial link in Schachter's argument lacks empirical support. It is true that certain analyses made by Wrightsman (which we have not cited) do provide data consistent with self-evaluation interpretations, but none of them bears on the relationship of ordinal position to self-evaluation.

In the experiment described below we hope to clarify some of the ambiguities of the Wrightsman study through independent manipulations of the opportunity for anxiety reduction and self-evaluation.

We shall start by making two assumptions in regard to birth-order differences and then trace out the implications of these assumptions for behavior in a group setting:

1. First borns have a greater need for self-evaluation than later borns.

2. First borns have a greater need for anxiety reduction than later borns.

If we now make some additional assumptions which specify certain motivational determinants of liking for other persons, we shall be in a position to make some differential predictions for first borns and later borns. These assumptions are:

1. The greater the number of needs one person is perceived as gratifying for another, the more that person is liked; and conversely, the greater the number of needs one person is perceived as frustrating for another, the more that person is disliked.

2. The gratification of an important need generates more liking for a person perceived as instrumental to that gratification than does the gratification of an unimportant need; and conversely, the frustration of an important need generates more dislike for a person perceived as responsible for that frustration than does the frustration of an unimportant need.

The utility of similar or virtually equivalent assumptions has been demonstrated in the work of Schachter (1951), Festinger (1954), and Ring (1964).

Finally, let us now imagine the four following conditions: (*a*) where both the needs for anxiety reduction and self-evaluation are gratified; (*b*) where the need for anxiety reduction is gratified, but the need for self-evaluation is frustrated; (*c*) where the need for self-evaluation is gratified, but the need for anxiety reduction is frustrated; (*d*) where both needs are frustrated. Can we make differential predictions for first borns and later borns under these four conditions?

From the first "liking" assumption alone it would clearly follow that an individual—whether he be first or later born—would most like individuals associated with *a*, least like those associated with *d*, and like to an intermediate degree those in *b* and *c*. However, the addition of Liking Assumption 2 makes it evident that this differentiation would be sharper (i.e., the extent of the difference between *a* and *d* would be greater) for first-born individuals. In fact, to the extent that the needs for anxiety reduction and self-evaluation are not important at all for later borns (see Birth-Order Assumptions 1 and 2), one would, of course, expect to find for the latter no differentiation among the four conditions in terms of liking; the differentiation would be anticipated only for first borns.

We may therefore state as one hypothesis that the differentiation between *a* and *d* will be greater for first borns. Confirmation of this hypothesis will be taken as support for the assumptions that first borns exceed later borns in their need for anxiety reduction and self-evaluation.

It will be recalled that Wrightsman's study was most unclear on the question of the relationship of birth order to self-evaluation. For this reason, two further tests of the self-evaluation assumption were planned and will now be briefly discussed.

It is an axiom of social comparison theory (Festinger, 1954), which provides the theoretical underpinning for Schachter's (1959) work, that where discrepancies exist among the members of a group, pressures will arise which act to reduce these discrepancies. Theoretically, these pressures stem from the desire of the group members to evaluate themselves, and self-evaluations, so the theory goes, are likely to be unstable and unreliable where discrepancies exist. According to Festinger, one way to reduce discrepancies within a group is to change one's own position to bring it closer to the modal opinion in the group. In other words, movement toward either the "average" or modal position of the group is construed, within the framework of this theory, as reflecting self-evaluative needs.

If our self-evaluation assumption is correct, we ought to find greater tendencies on the part of the first borns to move toward the average or modal emotional level in the group. When anxiety is the emotion in question, movement in the direction of the group should occur no matter whether the group level of anxiety is higher or lower than that of a given *S*. Such a suggestion is, of course, quite compatible with Schachter's theorizing, for he says:

for first-borns . . . anxiety reduction is not an inevitable consequence of being with others. First-born subjects . . . are more influencible than later-born subjects. If the tenor of a group discussion were to be really terrifying and anxiety provoking, it might indeed be anticipated that the anxiety of first-borns would be greater than that of later-borns [p. 112].

A clear test of this hypothesis requires some control over the group interaction; this we have attempted through the simple expedient of using experimental confederates.

A second test of the self-evaluation assumption is possible by means of recourse to some data collected in connection with another study (Ring & Braginsky, unpublished study).[2] In this study, *S*s—who are comparable to those who took part in our experiment—were administered a newly devised test which was designed to measure the need for self-evaluation. It is easy to compare first-born and later-born respondents in terms of their total score on this test. We should certainly expect first borns to score significantly higher. Of course, it will be necessary to show that this test actually does measure the need for self-evaluation; data in this connection will be presented when the test is discussed subsequently.

To summarize, the major purpose of the studies described below is to test the assumptions concerning birth-order differences in the need for anxiety reduction and self-evaluation. If these assumptions and their implications are supported, they will provide the groundwork for a theory which attempts to incorporate the findings of a number of studies dealing with different correlates of ordinal position of birth.

METHOD

Subjects

Ninety-six female undergraduate students served as *S*s in the experiment. Sixty-four of these were allocated to one of four experimental treatments, while the remainder were used in one of two control groups. All *S*s were drawn from a subject pool formed from different sections of the introductory psychology course at the University of Connecticut. Participation is on a voluntary basis, and, in this experiment, there was no financial compensation. Exactly half of the *S*s were first born,[3] and half were later born.

Experimental Design

A 2 × 2 × 2 factorial design was used, each cell having an equal representation of first-born and later-born *S*s. The two experimentally manipulated variables were level of group anxiety (high and low) and ease of self-evaluation (easy and difficult). These variables were manipulated by using two female experimental confederates. In any given experimental session three individuals, excluding *E* (experimenter), were present: the two stooges and a naive *S*. It is most convenient, in describing the experimental design, to consider the four experimental treatments separately:

High Anxiety–Easy Evaluation (*HE*). In this condition, both stooges were instructed and trained to act in a rather anxious fashion about the impending experiment during a 5-minute waiting period when *E* was out of the room. In terms of an anxiety dimension, which was used for training purposes, stooges were told to attempt to give an impression consistent with their being located at 70 on the anxiety scale which extended from 0 to 100. (Verbal definitions were provided for 6 points on the scale: 0—not at all anxious; 20—a little anxious; 40—somewhat anxious; 60—moderately anxious; 80—quite anxious; 100—extremely anxious.) Since the stooges would appear anxious, it was reasoned that it would be difficult, if not impossible, for most *S*s to reduce their own anxiety by using the stooges as reference persons. At the same time, since the stooges through their behavior would be evincing approximately the same level of anxiety, it should not be difficult for an *S* to decide how she ought to feel. In other words, in an unstructured situation there is uniformity of emotional state in the others present; self-evaluative needs, therefore, may be easily gratified here. To summarize, the behavior of the stooges in this condition was intended to frustrate the need for anxiety reduction, but permit the gratification of the need for self-evaluation.

High Anxiety–Difficult Evaluation (*HD*). Here, one stooge was instructed to represent herself as extremely anxious (100), while the other was told to appear somewhat anxious (40). It will be noted that the "average" of the anxiety levels of the stooges is precisely the same as in the HE condition, that is, 70. Of course, it is nonsense to believe that the perceived level of anxiety was the same in both conditions; it is a gross oversimplification (but a necessary one) to say that individuals assess the level of emotionality in a group by

[2] Unpublished study entitled "The measurement of self-evaluation"; available from author.

[3] First-born *S*s include both only children and children with siblings. We follow Schachter (1959) here, who customarily placed all first borns into a single category, regardless of number of siblings. In addition, when comparing first-born to only children, he failed to find any systematic differences between them.

a simple averaging of the levels of each member—obviously, things are a little bit more complicated than that! Nevertheless, the introduction of a 60-point discrepancy between the stooges has the advantage of making self-evaluation difficult (see p. 4). Thus, this condition is intended to frustrate both the needs for anxiety reduction and self-evaluation.

Low Anxiety–Easy Evaluation (*LE*). Both stooges portray themselves as low in anxiety (30). Such behavior on their part should enable *S*s to reduce their own anxiety and at the same time achieve self-evaluation.

Low Anxiety–Difficult Evaluation (*LD*). One stooge appears to be moderately anxious (60), the other, not anxious at all (0). Anxiety reduction ought to be possible here, but self-evaluation should be difficult.

Control Conditions

Together–No Talk (*TNT*). In each of the experimental conditions, the stooges convey the appropriate level of anxiety primarily through verbal means and secondarily (but still importantly) through accompanying gestures and other expressive movements. In this condition, the stooges sat quietly and passively, after all three individuals (i.e., stooges and *S*) had been enjoined by *E* not to talk after he left the room.

Alone (*A*). In this condition, no stooges were ever present and, accordingly, the *S* spent the waiting period alone.

It will be observed that our experimental design is no more than an elaboration of Wrightsman's original set of conditions. The four experimental conditions represent refinements of Wrightsman's "together-talk" treatment, while our two control conditions, in all essential respects, parallel his.

In each of the six conditions (both experimental and control), there was a total of 16 *S*s, 8 first born and 8 later born.

Procedure, Measuring Devices, and Checks on the Manipulations

In all conditions, when *S* came to the experimental laboratory, she was escorted by *E* to a seat at a semicircular table. Except for the *A* condition, *S* was situated between the two stooges. Typically, (unless *S* arrived quite early), one stooge was already seated by the time *S* came to the laboratory; the other (who waited in an adjoining room) would characteristically arrive a few moments after *S*.

When all three were present (except for the *A* condition, of course), *E* introduced himself and the participants to one another. He explained very briefly that they would all be taking part in an experiment concerned with auditory stimulation, but before they could begin, it would be necessary to fill out some routine forms which, he said, would be self-explanatory. The *E* then distributed a questionnaire labeled: "Auditory Stimulation Experiment Questionnaire—Form II-L." Immediately after doing so, *E* apologetically commented that the "equipment wasn't ready yet" and it would be necessary for him to leave the room for a few minutes to make some adjustments. Before departing, *E* cautioned the group to be sure not to talk before everyone had finished "because we need to have your own independent answers." He indicated that he didn't care whether they talked after that. The *E* then left the room and entered an observation room in order to make sure no talking occurred during the prohibited interval (none ever did) and to monitor the performances of the stooges. The *E* remained absent for a period of 5 minutes.

The purpose of the questionnaire was explained as follows:

> In previous auditory experiments we have found that a very sensitive indicator of one's performance is one's mood. One of our secondary purposes in conducting this study is to try to specify more exactly the relationships between the various moods of a person and his behavior under conditions of auditory stimulation. Accordingly, we ask you to fill out the following questionnaire which is concerned with your own mood states. For each item, please answer in terms of *your own feelings at this very moment.*

After some further instructions concerned with how to use the rating scales in the questionnaire, each *S* was asked to describe herself, on a 101-point scale demarcated at 5-point intervals, in terms of the following moods: depression (The exact wording was: "How depressed would you say you feel at this moment?"), excitement, cheerfulness, boredom, good humor, anxiety, pensiveness, sleepiness, irritability, and calmness. Obviously, most of those moods serve as filler items. Following each mood scale, another 101-point scale appeared on which *S* was instructed to indicate her degree of confidence about the self-rating she had just made. The purpose of these confidence scales will be made clear in a moment.

Stooges paced themselves so that they would finish "answering" their questionnaires about the same time as did *S*. When all had finished, one of the stooges initiated a conversation with the other two girls. Because *S* would inevitably take part in these conversations, it was not possible by any means to standardize them completely within any given treatment. Stooges were given two principal rules to guide them, however: (*a*) they were to stick as closely as possible to certain standard comments (for a particular condition) that had been well practiced in rehearsal sessions and which were deemed appropriate to the anxiety level a stooge was supposed to convey, and (*b*) where stooges were to appear discrepant from one another, they were cautioned to resist the pressures toward uniformity (Festinger, 1950, 1954) that they were necessarily inflicting upon one another.

The *E* returned after 5 minutes had elapsed, collected the completed questionnaires, and then distributed a fresh copy of the questionnaire to each girl. The *E* explained this action by saying, in effect, that moods are inherently subject to fluctuations over even very short periods of time and, in order to have the most accurate assessment of their moods, it was probably desirable to have the girls rate themselves again. The *E* concluded: "Two measures are better than one."

The purpose of this readministration was twofold. The mood reratings permitted us to assess the effectiveness of the manipulation of anxiety while the changes in confidence ratings constituted a check on the ease of evaluation manipulation. It follows from social comparison theory that a person should feel more confident about "what he is like" to the extent he can achieve self-evaluation. Therefore, confidence about one's self-ratings ought to increase, or at least not decline, under conditions of easy evaluation, but it should decline where self-evaluation is difficult.

After collecting these questionnaires, *E* said in a casual and nonchalant way (as if this were all a routine matter prior to the "real" experiment) that, of course, some mood changes were spontaneous, but that, to some extent, the moods of one person might be influenced by the moods of others. "In order to control for this," *E* said, it would be necessary to take a few minutes so that each person could indicate how she thought the other two felt. For this purpose, two fresh copies of the previously used questionnaire were given to each person who was asked to describe the others in terms of it.

The actual purpose of this administration was, of course, to check *S*'s perception of the stooges in order to see whether their performance was successful in conveying the appropriate impression about their emotional state.

The *E* now informed the girls that there was just one more item of business and then they could finally start the experiment. He explained that some of the groups were going to be called back later on in the semester for continued testing and since congenial groups were wanted, it would be helpful if the girls indicated as best they could how they felt about one another. Their answers, *E* continued, would of course be private and held in strictest confidence.

This sociometric questionnaire contained items dealing with such matters as how interested *S* would be in participating in future experiments with the same girls; how comfortable she felt with them; and, most importantly, how much she liked each of them and why. These items are relevant to the predictions discussed in the introduction concerning birth order and liking.

After *S* had completed her questionnaire, the stooges were dismissed, and the entire experiment was explained to *S* alone. The reasons for the deceptions were indicated, and any questions *S* asked, answered. Most *S*s were more amused than indignant about being fooled, and in no case did an *S* appear emotionally upset. The *E*, while engaged in this catharsis session, attempted to ascertain whether *S* had previously heard anything about the experiment or had suspected either that the other girls were experimental confederates or that there was to be no "auditory stimulation" experiment. About 10 *S*s had to be eliminated for one or more of these reasons. Before *S* left, *E* made her promise not to reveal anything about the experiment to her friends.

RESULTS

Reallocation of Ss to Treatment Conditions

Although the experiment was planned with the aim of equal *N*'s within cells, it became apparent upon analysis that this formal objective would, ironically, serve only to increase error variance. The reason for this is as follows: generally speaking, the stooges did a good job in portraying the appropriate level of anxiety, but occasionally an *S* would of course assign anxiety levels to the stooges that were quite discrepant with those they intended to convey. (This discrepancy could be attributed either to a poor performance by one or both of the stooges or to the idiosyncratic perception of *S;* for present purposes, however, the source of the discrepancy is irrelevant.) Not only that, but an *S*'s perception of the stooges might correspond very closely to how the stooges were supposed to appear in another condition. This would be true, for example, when both stooges in an LE condition would be rated on anxiety, say, at 65, a rating very close to the ideal for the HE condition. Psychologically, it would be nonsensical to retain such an *S* in the LE condition; the phenomenal state (and, hopefully, the emotional state) of such a person is clearly much more similar to the average HE *S* than to the LE *S*.

On the basis of this reasoning, a reallocation of *S*s to the most appropriate treatment condition—based on *S*'s ratings of the stooges—was performed. Reallocations were made independently by two of the authors, and the few disagreements that resulted were resolved through discussion afterwards. Here it must be noted that anxiety ratings were not the sole criterion for reallocation; ratings of "calm" were considered equally important for this pur-

TABLE 1

Distribution of Subjects According to Original and Reallocated Condition (Separately for First-Born and Later-Born Subjects)

Original condition	Reallocated condition							
	First borns				Later borns			
	HE	LE	HD	LD	HE	LE	HD	LD
HE	6	1	1	0	5	1	2	0
LE	2	5	1	0	3	3	0	2
HD	3	0	3	2	3	0	5	0
LD	1	1	3	3	1	2	4	1
Total	12	7	8	5	12	6	11	3

pose and ratings of "excited" were used as an ancillary criterion. The reason for these multiple criteria is that, from postexperimental questioning of *S*s coupled with close inspection of the data, it seemed quite clear that there was no uniformity of interpretation of the term "anxious" by *S*s. There are at least three distinct connotations this word could have: (*a*) excited, (*b*) eager with anticipation, and (*c*) apprehensive and nervous. Since only the last of these is what we had wished this term to convey and since there is reason to believe that anxious was often taken to mean either excited or eager, it seemed wiser to utilize multiple criteria for this reallocation rather than depend upon a single and probably unreliable criterion.

*S*s were assigned to a particular treatment on the basis of the following rules: if the mean anxiety rating of the stooges was 50 or less and the mean calm rating 50 or more, an *S* was placed in a low-anxiety condition (decisions on ambiguous or inconsistent cases were made by considering also ratings of the stooges on excited); otherwise, an *S* was assigned to a high-anxiety condition. If the mean difference between the ratings of the two stooges, on both anxiety and calm, exceeded 20, an *S* would be assigned to a difficult-evaluation condition; if not, she would be assigned to an easy-evaluation condition.[4] By following these two rules, it was possible to allocate every *S* to one of the four treatment conditions of the experiment. This reallocation of *S*s resulted in the cell frequencies shown in Table 1. The column sums represent the number of cases in each condition following reallocation. The numbers comprising the major diagonal represent *S*s who remained in their original condition.

Check on the Ease-of-Evaluation Manipulation

In effect, the subject reallocation has made it unnecessary for us to ask whether

[4] It might be contended that this reallocation procedure entails two dangers: (*a*) the differences between the conditions (on both the anxiety and evaluation dimensions) are much less sharp than originally intended (another way of putting this would be to say that within-cell variance, while it may be reduced through this procedure, is still likely to be very much larger than it would have been if the original design had proved feasible), and (*b*) it may be misleading to place together within the same cell *S*s who perceived the stooges in a way consistent with the anxiety levels the latter were trying to convey (i.e., those *S*s whose cell membership was not affected by the reallocation procedure) with those who perceived the stooges in a way discrepant with the impression the latter were attempting to foster (i.e., those on whom the manipulation didn't work). These are fair criticisms and together they suggest that only those *S*s should have been used who "took" the manipulation as it was intended; all others should have been discarded. How may we answer these criticisms?

Concerning the first-mentioned objection, we can say only that while it is true that the cells are indeed likely to be more heterogeneous than we would have wished, if our hypotheses are borne out that will be so in spite of, rather than because of, this fact. Such variability patently operates against our finding differences between cells, but if they emerge, then the effects of the variables investigated are surely even more potent than they appear. As for the second objection, much the same argument would seem to apply; in addition, there is really no firm operational basis for the claim that the two sets of *S*s are different (their ratings of the stooges at least are equivalent), and, in fact, there is every reason to infer that their phenomenal worlds are comparable.

the anxiety manipulation was successful; we have made it "work" by assigning *Ss* to treatments on the basis of the anxiety ratings they gave to the stooges, independently of whatever experimental manipulation they happened to receive originally. While this procedure likewise exempts us from having to assess the ease of evaluation manipulation (if it is defined simply in terms of perceived discrepancy between stooges), it will be recalled that it was argued (see p. 7) that confidence concerning one's self-ratings ought to increase, or at least not decline, under conditions of easy evaluation, but ought to decrease where evaluation is difficult. We may check these implications by reference to the data in Table 2.

It will be seen that, while there are essentially no differences among conditions for later borns, there is a suggestion of an increase in confidence under easy-evaluation conditions for first borns, whereas no marked change under difficult conditions is apparent. This difference, however, falls short of significance due to the great variability of the scores of first-born *Ss* (a matter to which we shall return in a moment). Save for this trend, the implication from social comparison theory concerning the relationship of discrepancy between reference persons and changes in confidence of self-ratings is not supported.

Before proceeding, it is necessary to explain why, in Table 2, we have used the calm dimension instead of that of anxiety. The reason is quite straightforward: the variability of interpretation of the word calm did not seem—again on the basis of postexperimental questioning and inspection of the data—to be nearly so great as was the case for anxiety, the ambiguities of which we have already considered. Accordingly, we chose to use the calm dimension (actually, the calmness scores were transformed to make them parallel to anxiety scores by subtracting them from 100) consistently for all major analyses reported in this study.

Birth-Order Differences in Confidence Ratings

In the analysis of the confidence data, certain ordinal position differences were noted which, while not predicted, fit in rather neatly with the birth-order theory to be considered later. We shall present these data here, but defer discussion of them for now.

As can be seen in Table 2, the variability of change scores for first borns seems to be substantially greater than that of later borns. A variance test confirms this impression ($F = 8.73$ with 31 df; $p < .001$). In fact, later borns hardly change at all, but the confidence of first borns often shifts dramatically (in both directions). It should be noted that these fluctuations occur under all experimental conditions.

A comparison of confidence scores on initial self-ratings of calm for these same *Ss* disclosed that first borns were significantly less confident about their judgments (on this dimension) than later borns (70.47 for first borns, 81.41 for later borns; $t = 2.08$, $p < .05$). The question that immediately suggests itself is, of course, how generalized is this relative lack of confidence on the part of first borns concerning their self-ratings? While the range of judged characteristics used in this study was not very wide (only the 10 "moods"), it is possible to say that this relative lack of confidence did not extend even over these items. It did,

TABLE 2

MEANS AND STANDARD DEVIATIONS OF CHANGE IN CONFIDENCE RATINGS ON THE CALM DIMENSION (SECOND RATING—FIRST RATING)

Birth order		LE	HE	LD	HD
First borns	$\bar{X}$	7.86	11.67	3.00	−1.25
	s	24.13	20.04	18.57	11.58
Later borns	$\bar{X}$	0.83	2.92	0.00	0.91
	s	5.84	6.20	5.00	7.69

TABLE 3
Mean Changes in Calm Self-Ratings (Second Rating—First Rating)

Birth order	LE	LD	HE	HD
First borns	−7.14	−12.00	−10.00	−28.12
Later borns	−15.83	−1.67	1.67	8.18

interestingly enough, hold for anxiety (75.78 for first borns, 88.28 for later borns; $t = 2.59$, $p < .02$), but there were no other significant birth-order differences in confidence ratings for any of the remaining moods.

Birth-Order Differences in Influenceability

It will be convenient to postpone the presentation of the data on liking until after we have considered the findings dealing with influenceability—findings which will aid in the interpretation of the liking data.

There are two very closely related questions here: (*a*) Are first borns more influencable than later borns (see quote, p. 5)? and (*b*) Will first borns make stronger attempts than later borns to reduce the discrepancies between themselves and others by moving toward the perceived emotional level of others (presumably in the service of self-evaluative needs)?

The answer to the first question may be found by reference to the data in Table 3 which presents the changes in calm self-ratings for first borns and later borns according to experimental treatment.

An analysis of variance[5] of these data is presented in Table 4.

While first borns, in general, become more afraid (less calm) over time, the effect is most marked under conditions of high anxiety and difficult evaluation. These trends are not apparent for later borns, who, if anything, seem to become more calm under conditions of high anxiety and difficult evaluation. Although the borderline significance levels of these effects suggest the need for considerable caution on this matter, these data point to the following conclusion: the emotional state (in terms of calmness) of first borns seems to change in accordance with their social environment; changes in the emotional state of later borns seem to be largely independent of this environment. In other words, first borns, as Schachter has asserted, seem to be more influenceable. Possibly a more conservative statement (more in keeping with the present data) would be that first borns are more susceptible to emotional contagion.

TABLE 4
Analysis of Variance of Changes in Calm Self-Ratings

Source	*df*	*SS*	*MS*	*F*	*p*
Evaluation (E)	1	4.32	4.32	—	
Anxiety (A)	1	57.12	57.12	—	
Ordinal position (OP)	1	2008.87	2008.87	3.61	.05–.10[a]
E × A	1	357.10	357.10	—	
E × OP	1	1555.68	1555.68	2.79	.10
A × OP	1	1751.60	1751.60	3.15	.05–.10
E × A × OP	1	25.73	25.73	—	
Within	56	31187.54	556.92		

[a] A *t* test between FBs and LBs proves significant at better than the .05 level. The mean change for FBs was −14.22, for LBs, 0.31; $t = 2.43$, $.02 < p < .05$. Because of the unequal cell frequencies the ordinal position effect in the analysis of variance is quite discrepant with the *t* test reported.

[5] Because of unequal cell frequencies, all analyses of variance reported in this paper have been calculated using the method of unweighted means, following the procedure outlined by Winer (1962, p. 222 ff.).

TABLE 5
MEAN CONVERGENCE SCORES FOR THE CALM DIMENSION

	LE	LD	HE	HD
First borns	−11.43	10.00	26.67	−5.00
Later borns	−1.67	−23.33	−9.17	−5.91

A more precise test of the differential influenceability of first borns is available by taking into account the extent to which any given *S* moves toward or away from the perceived emotional level of the two stooges. This "convergence score," as we have called it, is defined as follows:

$$\text{Convergence} = (|SR_1 - S_1| - |SR_2 - S_1|) + (|SR_1 - S_2| - |SR_2 - S_2|)$$

SR_1 = *S*'s initial self-rating on calm
SR_2 = *S*'s second self-rating on calm
S_1 = *S*'s rating of the first stooge on calm
S_2 = *S*'s rating of the second stooge on calm

A positive convergence score shows a net tendency to move oneself closer to the level of the stooges; a negative score shows a net tendency to move away from the stooges; a convergence score of zero shows, of course, no tendency to move either toward or away from the stooges.

In Table 5 are the mean convergence scores for each condition; the corresponding analysis of variance is presented in Table 6.

The data here on birth-order differences in convergence are quite clear-cut: first borns show a significantly greater tendency to move toward others compared to later borns. This difference is, of course, precisely what we would have expected on the assumption that first borns have a greater need for self-evaluation than later borns.

The only other significant effect, the triple interaction, is in part understandable on the basis of the data on change in calm self-ratings, already discussed (see p. 10). The most important aspect of this interaction concerns the HE cell: first borns move sharply toward the other stooges, even though this means that they are simultaneously becoming markedly less calm; for later borns the opposite is the case. This finding would seem to have implications for the relative strengths of the needs for self-evaluation and anxiety reduction; these implications will be pursued in the discussion section.

It is possible to conceive of even a "purer" test of these convergence effects. Let us take all *S*s who show a change in calm self-rating and who, in terms of their initial self-rating, perceive both stooges as either higher or lower (in calmness) than themselves. Then, let us see whether these *S*s move toward or away from the stooges. There are 28 *S*s who meet these specifications, and their data are presented in Table 7.

The birth-order differences are striking: all 14 first borns move in the direction of the stooges; only half of the later borns do

TABLE 6
ANALYSIS OF VARIANCE OF CONVERGENCE SCORES ON THE CALM DIMENSION

Source	*df*	*SS*	*MS*	*F*	*p*
Evaluation (E)	1	858.46	858.46	—	
Anxiety (A)	1	697.23	697.23	—	
Ordinal position (OP)	1	2691.81	2691.81	4.51	<.05
E × A	1	522.02	522.02	—	
E × OP	1	116.70	116.70	—	
A × OP	1	234.75	234.75	—	
E × A × OP	1	5340.43	5340.43	8.94	<.005
Within	56	33448.59	597.30		

TABLE 7
Direction of Movement Vis-a-Vis Stooges According to Birth Order

Birth order	Toward	Away
First born	14	0
Later born	7	7

so. This difference is significant at the .01 level by Fisher's exact test.

Before turning to the liking data, it is appropriate to ask, as we did for confidence ratings earlier, whether this differential tendency toward convergence is evident over all moods. The answer, as before, is that this is not a generalized disposition of first borns. The mean convergence scores for each of the 10 moods are presented in Table 8.

While there is obviously no overall difference between first borns and later borns, it is illuminating to note that birth-order differences in convergence are greatest (favoring first borns) on the "emotionality triad" consisting of calmness, excitement, and anxiety. If we compute a difference score for each *S* taking his mean convergence score on the "emotionality triad" and his mean convergence score on all remaining moods, we find for first borns a significantly greater ($z = 2.13$, $p < .05$ by a rank sum test) tendency toward convergence on the emotionality triad, while there is no difference for later borns. The difference between the difference scores for first borns and later borns approaches significance ($z = 1.92$, $p = .06$).

TABLE 8
Mean Convergence Scores on All Moods for First Borns and Later Borns

Mood	FB	LB	Difference
Calm	7.81	−7.50	15.31
Excited	14.68	6.56	8.12
Anxious	11.88	7.19	4.69
Cheerful	2.82	0.94	1.86
Depressed	2.18	0.62	1.56
Good humored	1.56	3.75	−2.19
Bored	4.06	6.88	−2.82
Sleepy	0.00	3.12	−3.12
Irritable	−2.50	5.31	−7.81
Pensive	4.38	13.44	−9.06

These results clarify our birth-order differences on influenceability. We conclude that first borns are more influenceable than later borns and more likely to reduce discrepancies between themselves and others by moving toward others, but only on dimensions of emotionality. Even here, of course, we have demonstrated this only for one type of emotion, that comprised by calm-anxiety-excitement. Whether these differences hold for other emotional states (e.g., euphoria) is a question for further research.[6]

Birth Order and Liking for Stooges

In the introduction, we argued, with the aid of supplementary assumptions, that if first borns have both a greater need for self-evaluation and anxiety-reduction, they should like most the stooges in the LE condition, like least those in the HD condition, and like to an intermediate extent those in the remaining conditions. These same general trends were also predicted for later borns, but it was maintained that they would be much weaker, if indeed they appeared at all (see p. 4). On the last of the postexperimental questionnaires, we asked *S*s to answer items concerned with the following matters:

1. how interested they would be in participating in future experiments with the same girls;

2. how comfortable they felt waiting with these girls;

3. whether, if they were called back for further experiments, they would prefer to

[6] Obviously, alternative interpretations are possible here and need to be refuted before our "emotionality" hypothesis can be held with any confidence. Possibly the moods constituting the emotionality triad are simply more important in interpersonal settings, and their emotional character is really irrelevant. Also, it might be argued that since we were in effect trying to manipulate this emotion, differences here might be expected to be clearest; perhaps if we had manipulated, say, depression, birth-order differences would have been most marked on that dimension. In any case, these interpretations are easily tested.

wait alone, with these girls, or with other girls;

4. how much they liked each of the girls.

For this analysis, two scores were calculated: (*a*) the sum of the liking ratings received by the two stooges (the liking score) and (*b*) the sum of the ratings of all four items (the total attractiveness score). The results of this analysis, for both dependent variables, are shown in Table 9.

Inspection of the data discloses that the trends are, in general, as predicted: for first borns, stooges are most favorably evaluated in the LE condition, most unfavorably evaluated in the HD condition, while the other two conditions fall in between. For later borns, no systematic differences appear except that stooges in the LD condition are rated most favorably. This finding should not be given much weight, however, inasmuch as this cell contains the smallest number of Ss (three) in the experiment.

We must hasten to add that neither analysis of variance shows any significant effects. These data, then, while "in the right direction," cannot by any means be taken as supportive of the hypothesis.

Of the many possible reasons why this hypothesis was not confirmed, most crucial for our theoretical purposes are those relating to the assumptions linking the satisfaction of self-evaluation and anxiety-reduction needs to liking. It may prove illuminating to test some further implications of these assumptions in order to assess the factors responsible for this failure of prediction. Since we are primarily concerned with birth-order differences in self-evaluation and anxiety reduction, the analyses that follow ignore the experimental treatment to which *S*s were allocated.

One testable implication of the self-evaluation assumption is that, other things being equal, one should tend to like those who are similar to oneself; such persons are more likely to be able to satisfy one's need for self-evaluation than persons who are dissimilar (Festinger, 1954). It seems reasonable to assume that those stooges who are perceived to be "close" to *S*'s own level of calmness ought also to be perceived as more similar than those who are more distant.

One test of this implication would consist of taking, for each *S*, the difference between his liking rating for the stooge closer to his own self-rating and that assigned to the more distant stooge. There would then be a single observation, in the form of a difference score, for each *S*. When this type of analysis was performed using calm self-ratings it was found that there was only a slight and insignificant tendency for first borns to like relatively more than later borns those stooges closer to their own (second) self-rating. However, we happened to make exactly the same analysis using second self-ratings on anxiety, and quite divergent results emerged which seemed sufficiently intriguing to warrant inclusion here. It should be explicitly stated at the outset, however, that these findings must be interpreted with caution inasmuch as (*a*) they are based on a different dependent variable from that used throughout this study and (*b*) similar results were *not* obtained when using calm scores. We are frankly at a loss to account

TABLE 9

MEAN LIKING AND TOTAL ATTRACTIVENESS SCORES

	LE	LD	HE	HD
First borns				
Liking	5.29	6.00	5.67	6.25
Attractiveness	10.00	10.40	10.58	12.12
Later borns				
Liking	6.33	5.33	6.08	6.09
Attractiveness	11.00	10.00	11.08	11.73

Note.—Liking scores may range from 2 to 14; attractiveness scores, from 5 to 23. In each case, a low score indicates a favorable response.

TABLE 10

Mean Liking Ratings for "Close" and "Distant" Stooges Based on Second Anxiety Self-Ratings, Using Each Subject as His Own Control

Birth order	Close	Distant	Mean difference[a]	p
First borns (24)[b]	2.66	3.42	−.76	<01[c]
Later borns (28)[b]	3.11	3.07	.04	n.s.

[a] The difference between these difference scores is significant at approximately the .02 level (t = 2.39 with 50 *df*).

[b] The numbers in parentheses represent individuals. All *S*s who assigned exactly the same rating to both stooges (eight first borns, four later borns) had, of course, to be eliminated from this analysis.

[c] t = 2.88 with 23 *df*.

for this discrepancy which represents the major inconsistency of the study.

The results of this analysis are presented in Table 10.

It will be observed that first borns tend to like those close to themselves and, relatively, to dislike those who are more distant. No relationship between distance and liking is apparent for later borns. It is obvious that these findings offer strong support to the hypothesis that first borns, as compared to later borns, have a greater need for self-evaluation.

Two additional findings relevant to this analysis should be mentioned: (*a*) for first borns, sheer distance from one another, rather than the direction of the distance, seems to be the crucial factor in accounting for relative dislike: that is, those who were less anxious were liked no better than those who were more anxious (it is apparent that such a finding is consistent with a self-evaluation hypothesis, but contradicts an anxiety-reduction interpretation; we shall return to this point); (*b*) these birth-order differences cannot be attributed to differences in the average distance between one's self-rating and those assigned to the stooges; there were no significant differences between first borns and later borns in the average distance between *S*s and either the close stooge or the distant one.

TABLE 11

Mean Liking Scores for Stooges as a Function of Moving toward or away from Them on Calm

Birth order	Toward	Away
First born	3.00 (32)	3.00 (19)
Later born	3.23 (22)	2.81 (31)

Note.—Numbers in parentheses represent observations, not individuals; no significance tests were applied because of the nonindependence resulting from the fact that there are two ratings from each *S*. The liking ratings of all those *S*s whose calm self-ratings did not change are, of course, not included here.

For the sake of thoroughness we shall mention one further implication of the self-evaluation assumption which we investigated. It can be argued that a person toward whom one converges (in the sense of moving toward the perceived emotional level of that person) is, other things being equal, more likely to satisfy one's need for self-evaluation than a person from whom one diverges. If this is so, then it follows from the assumptions stated in the introduction that the former ought to be better liked than the latter. Table 11 presents the data.

There is manifestly no evidence to justify the supposed linkage between approach tendencies and liking.

Let us now turn to implications of the assumption relating anxiety reduction to liking.

If anxiety reduction leads to liking, it seems reasonable to predict that stooges who appear to be calm will, in general, be better liked than those who do not. There are two ways this prediction might be tested. One could compare the mean liking ratings assigned to the stooges who are low, intermediate, and high on the calm variable. One could also take as a reference point an *S*'s self-rating and compare the mean liking rating assigned to those who fall above and below *S*'s own self-rating.

We have done both, and these comparisons appear separately in Tables 12 and 13.

While the second of these analyses (Table 13) reveals no birth-order differences, the first (Table 12) is extremely provocative. Not only are the trends in liking directly opposite for first borns and later borns, but they are exactly the reverse of what we would have expected on the assumption that first borns have a greater need for anxiety reduction. These data show, on the contrary, that for first borns, the less calm a stooge appears the more he is liked. It is, surprisingly, later borns who seem to like calm-appearing stooges. The data in Table 12, it should be noted, also fail to support the assumption mentioned above as do the data previously reported in connection with anxiety and liking (see p. 14).

The gist of all these findings seems to be that later borns, if anything, have the greater need for anxiety reduction. It is patently true, however, that we need better data to document this assertion. Happily, another implication of the anxiety-reduction–liking assumption can supply them.

If we like people who reduce our anxiety for us, then it's clear we ought to like those in whose presence our anxiety decreases (and who, presumably, are seen as instrumental in that decrease) and, relatively, to dislike those in whose presence our anxiety increases. If, further, it is true that it is later borns, rather than first borns, who have a stronger need for anxiety reduction, this difference in liking ought to be most apparent for them. Since the sum of the liking ratings for the two stooges may be used here for each *S*, it is again possible to perform a much needed test of significance.

TABLE 13
Mean Liking Ratings Assigned to Stooges Who Were Either Higher or Lower on the Calm Dimension Relative to *S*'s Second Self-Rating

Birth order	Higher	Lower
First born	2.79 (29)	2.92 (25)
Later born	2.95 (21)	3.12 (34)

Note.—*N*'s represent observations, not individuals. No significance tests were applied for reasons stated previously. The liking ratings of *S*s whose self-rating coincided with that given to a stooge are, of course, not included here.

The results of this analysis are shown in Table 14.

The most straightforward test of our newly formulated hypothesis involves a comparison of "increasers" with "decreasers." As expected, there is no difference for first borns, but a rank-sum test reveals that the stooges associated with later born "decreasers" tend to be significantly less liked compared to the stooges in whose presence later borns increase in calmness ($z = 1.92$, $p = .06$). It is clear that if "no changers" had been classified with "decreasers" (on the assumption that they, too, failed to experience any anxiety reduction), this difference would have been even more marked. Thus, it appears that we shall have to reverse ourselves on the question of the relationship between birth order and the need for anxiety reduction. These analyses seem to force the conclusion that the need is greater for later borns.

Control Groups: Changes in Calm Self-Ratings

Additional evidence bearing on the relationship between birth order and anxiety

TABLE 12
Mean Liking Ratings Assigned to Stooges Who Were Perceived as Low (0–30), Intermediate (31–70), and High (71–100) on Calmness

Birth order	Low	Intermediate	High
First borns	2.82 (33)	2.89 (19)	3.08 (12)
Later borns	3.28 (29)	2.90 (20)	2.73 (15)

Note.—*N*'s represent observations, not individuals; no significance tests were applied for reasons stated previously.

TABLE 14

Mean Liking Ratings for the Two Stooges Combined as a Function of *S*'s Direction of Change in Calm Self-Ratings

Birth order	Increase	No change	Decrease
First born	6.12 (8)	4.33 (6)	6.11 (18)
Later born	5.21 (14)	6.60 (5)	6.77 (13)

Note.—Liking scores may range from 2 to 14. Numbers in parentheses represent individuals.

reduction is obtainable through a comparison of the experimental conditions, taken together, with the control groups. It will be recalled that Wrightsman found a significant decrease in anxiety for first borns in his together conditions (compared with his *A* condition) and no such relationship for later borns. On the basis of these data, he argued that first borns, but not later borns, choose to affiliate with others in part because of the anxiety-reducing functions that these others serve.

In the present experiment we have in effect replicated two of Wrightsman's conditions, TNT and *A*. We present the changes in calm self-ratings for these two conditions as well as for all experimental conditions combined in Table 15. In no case are there any significant-within-condition birth-order differences on initial self-ratings of calmness.

It is plain that not only have we not replicated Wrightsman's findings but, rather, that our data flatly are at variance with his (although, it should be noted, they are consistent with what we ourselves had found earlier). For first borns, in the experimental conditions (which may be roughly equated with Wrightsman's TNT condition), there is a significant decrease in calmness ($t = 3.00$, $p < .01$); Wrightsman found the opposite. There is likewise a decrease in calmness in the T-T condition (nonsignificant); Wrightsman again found the opposite. In the *A* condition, there is virtually no change; Wrightsman found a nonsignificant decline. Table 15 shows that first borns are most likely to maintain their initial calmness when they wait alone and are least likely to do so under together conditions. Wrightsman's data suggest that calmness will actually increase while waiting with others.

For later borns, we find a slight tendency to become more calm in the presence of others; so does Wrightsman. But where he finds similar effects when later borns wait alone, our later borns, on the average, show a sharp decline in calmness when they remain by themselves (the small *N* keeps this decline from being statistically significant).

Granting that the sample sizes of the control groups render firm generalizations impossible, the data in Table 15 nevertheless suggest the following hypothesis: in an ambiguous situation, being with others permits a later born to retain his initial state

TABLE 15

Mean Changes of Self-Ratings on Calmness for Experimental and Control Groups

	First rating	Second rating	Change	*p*
First born				
Experimental (32)	48.91	34.69	−14.22	<.01
Control (16)				
TNT (8)	66.88	63.12	−3.76	n.s.
A (8)	58.75	58.12	−0.63	n.s.
Later born				
Experimental (32)	54.84	55.16	0.32	n.s.
Control (16)				
TNT (8)	60.62	63.75	3.13	n.s.
A (8)	55.62	43.12	−12.50	n.s.

of calmness; if he is by himself, he becomes afraid. A first born, however, becomes less calm when he is with others (whether the others are seen as calm or not), but maintains his initial level of calmness when alone. In other words, affiliation seems to serve an anxiety-reducing function for later borns and an anxiety-arousing one for first borns. It may be, as Schachter (1959) and many others have clearly demonstrated, that first borns prefer—much more so than later borns—to wait with others when afraid, but we would submit that this occurs despite the fact that others raise the anxiety level of first borns, not because they lower it. Why the effect of other persons appears to be so different for first borns and later borns is, obviously, a very intriguing question to which we hope to provide a partial answer in our discussion.

Of course, all this suggests once more that the need for anxiety reduction is a more important determinant of affiliation for later borns than for first borns. There is, however, one possible artifact that blurs the picture a little. If we look at the terminal self-ratings on calmness for *Ss* in the experimental conditions, we note a striking difference between first borns and later borns (Table 16).

It is remarkable that not a single first born at the conclusion of the 5-minute interaction describes herself as relatively calm (i.e., rates herself higher than 70 on the 100 point scale). In contrast, 43% of the later borns depict themselves as calm.

One might argue, therefore, that the reason first borns don't seem to like calm persons (see p. 15), that they don't particularly like those in whose presence their own calmness increases (p. 29–30), and that they seem to have a weaker need for anxiety reduction, is simply because in no case do they ever become very calm themselves. Perhaps these conclusions would be altered if some of them did achieve relative calmness. It is really impossible to say, however, because even an internal analysis is precluded due to the complete absence of any first borns in the "high calm" cell with whom to compare later borns. Even supposing, for the moment, that our conclusions about ordinal position and anxiety reduction might have to be modified in the light of new data, the question remains: Why is it that not one first born, after the interaction, rated herself as calm, while nearly half of the later borns did so?

TABLE 16

TERMINAL SELF-RATINGS OF CALMNESS FOR EXPERIMENTAL *Ss*

Birth order	(Low (0–30)	Medium (31–70)	High (71–100)
First born	16	16	0
Later born	10	9	13

$\chi^2 = 16.34$, $p < .0005$

Birth-Order Differences on the Self-Evaluation Questionnaire

In the introduction we referred to a study (Ring & Braginsky, unpublished study) in which we attempted to measure the need for self-evaluation in a group of *Ss* comparable to those used in our experiment. For this endeavor we designed a self-evaluation questionnaire (labeled for administration purposes a "personality inventory"). One of the scores that can be derived from this instrument pertains to the need for self-evaluation concerning one's personality characteristics.[7] Fifty-seven female *Ss* (none of whom took part in the experiment reported above) for whom birth-order data are available took this questionnaire; 29 were first born, 28 later born.

The mean self-evaluation score of first-born *Ss* was significantly higher ($t = 2.37$, $p < .05$) than that of later borns. Thus we have evidence consistent with that considered earlier indicating a stronger self-evaluative need for first borns. It should be reemphasized, however, that self-evaluation in the present context refers to the evaluation of personality characteristics, not to emotional states. Just how generalized the need for evaluation is cannot, of course, be answered here, but it is an extremely im-

[7] The derivation of this score and the logic which underlies it may be found in the original report, a copy of which may be obtained by writing the senior author.

portant question and one with which we shall deal in the discussion section.

Work on the validation of this questionnaire is currently in progress, but one validation experiment has already been executed in connection with the questionnaire study itself. At the time of the test administration, *Ss* were told that, if they wanted to find out their results on the test, they could come later that week to a psychology department office where that information would be available. It was reasoned that if this questionnaire really did measure the need for self-evaluation, the mean score of those who appeared for their results ought to be higher than that of those who failed to come. This expectation was confirmed ($t = 2.38, p < .05$).

Discussion

Let us, at this point, recapitulate the major findings and conclusions of the experiment. We have presented data which indicate that:

Confidence

1. Confidence ratings of first borns on calmness are more variable than later borns.
2. First borns are less confident about their self-ratings of calmness and anxiety than later borns.

Influenceability

1. Being with others in an ambiguous, possibly dangerous, situation is anxiety-arousing for first borns, not so for later borns.
2. In general, changes in the emotional state of first borns seem to depend on the nature of the social environment to a much greater extent than is true for later borns; specifically, first borns show stronger tendencies than later borns to converge toward the emotional level of others.

Liking

1. First borns tend to like those who are like (i.e., similar to) themselves.
2. Later borns tend to like those who induce a decrease in their anxiety level.

On the basis of these, and other data, we conclude that: (*a*) first borns (as we assumed in the introduction) have a greater need for self-evaluation than do later borns and, with somewhat lesser confidence, (*b*) later borns have a greater need for anxiety reduction than do first borns (initially we had assumed precisely the opposite).

It will be recalled that in the introduction we also made two additional assumptions concerned with the determinants of liking (see p. 4). In conjunction with the assumptions alluded to in the preceding paragraph, we were then able to predict the relative liking which stooges in the various conditions should receive. Inasmuch as it now appears that later borns, rather than first borns, have the greater need for anxiety reduction, these specific predictions were bound to fail. The validity of the two assumptions specifying motivational determinants of liking is another question, however, and one, it should be pointed out, that was not of direct concern here. Such findings as first borns tend to like those who are similar to themselves and later borns those who reduce their anxiety can obviously not be cited as data relevant to these assumptions, since it was in part from these very results that the needs for self-evaluation and anxiety reduction, respectively, were inferred. For data pertinent to the validity of these assumptions, the reader is referred to the work of Ring (1963, 1964).

Quite clearly, we think, the major finding of this study (as well as the one which is best supported by the data) has to do with the greater influenceability of first-born individuals. Inasmuch as it is specifically their emotional state which seems to be more susceptible to social influence, we might more accurately conclude that first borns show greater evidence of emotional contagion than later borns: that is, they seem to "catch" and reflect the level of emotionality in a group more so than later borns.

This finding is especially noteworthy for two reasons. In the first place, it is now clear that the greater influenceability of first borns is not restricted to matters of opinion (see discussion, p. 4) but extends to the realm of emotions as well. Secondly, we have provided evidence which substantiates

Schachter's implicit and mandatory assumption that first borns have a greater need for self-evaluation than do later borns.

Incidentally, we do not mean to suggest that our particular interpretation of this contagion effect—in terms of self-evaluative needs—is the only one possible. There are of course always alternative explanations for any given result. What makes the self-evaluation interpretation reasonably compelling, we think, is that it is not only consistent with the influenceability data, but with the data on confidence and liking as well. Thus all the principal results of our experiment point toward (or at least can be "handled" by) the same interpretation. We would argue, then, that while another alternative explanation might as plausibly account for our influenceability data, no one alternative is likely to account for all of our data so well as the self-evaluation interpretation.

We shall now present a developmental theory which we believe can "make sense" of the principal results of this study as well as reconcile many disparate findings, related to birth order, from other investigations. We view this formulation with considerable tentativeness, of course, and we make no claim that many of the ideas it embodies have originated with us. Quite the contrary; we acknowledge especially the prior work of Schachter (1959) and Zimbardo and Formica (1963).

The starting point of this theory is the relatively inconsistent treatment the first born child receives from his parents (there is evidence that first borns are handled more inconsistently than later borns; see Sears, Maccoby, & Levin, 1957). If we assume, following such pioneers as Cooley (1902) and Mead (1934), that our self-conceptions reflect the ways significant others respond to us, then, plainly, the self-conceptions of first borns ought to be more confused (i.e., internally inconsistent) than those of later borns. Relative to the later born, the first born should be less certain what he, as a person, is like or, indeed, less certain about who he "really" is. In currently fashionable parlance, the first born may be regarded as having an "identity problem." If this is so, then we would expect to see him display behavior directed toward reducing these uncertainties about himself: that is, he should seek self-evaluation. Much of the first born's interpersonal behavior, we would argue, may be interpreted as reflecting essentially the Socratic dictum to "know thyself."

What sort of parental behavior is it that makes a first born uncertain about himself? Zimbardo and Formica (1963), drawing upon the work of Sears et al. (1957), have suggested that in part it is the gap between what the parents expect of the first born (Sears et al. have data which indicate that parents have higher aspirations for their first borns than for their later borns and expect more achievement from them) and what the first born is in fact capable of that leads him to feel unsure of himself and his abilities. Since there is no reason to think that first borns are any brighter than later borns (Murphy, Murphy, & Newcomb, 1937), the discrepancy between parentally instilled aspirations and ability should be greater for first borns than for later borns. What are some of the behavioral implications of this discrepancy?

Zimbardo and Formica have proposed that the greater this discrepancy, the lower a person's self-esteem. First borns, then, ought to have lower self-esteem than later borns; Zimbardo and Formica's data on this point tend to support this conclusion, although their birth-order differences are rather slight. Two consequences of low self-esteem seem especially worth noting.

Janis (Hovland & Janis, 1959) and his associates have shown that self-esteem is inversely related to influenceability. And it has been shown that first borns are, in fact, more influenceable than later borns (Ehrlich 1958; Becker & Carroll, 1962; Staples & Walters, 1961; as well as the present study).

People with low self-esteem seem to be influenceable in part because they are not sure about themselves. One sign of an uncertain self-evaluation should be lack of confidence concerning one's self-judgments. It will be recalled that we found first borns to be significantly less confident about certain of their self-ratings than later borns.

It is certainly a testable hypothesis that lack of self-confidence and need for self-evaluation tend to be associated and that both are more characteristic of first borns.[8]

We have argued that, compared to later borns, first borns are expected to do more than they can and that falling short of their aspirations leads to low self-esteem and lack of self-confidence. If it is true, however, that first borns do have higher aspirations, we ought to be able to find corroborative evidence in the literature. A review of relevant studies reveals the following information: first borns have higher need for achievement (Sampson, 1962), they get better grades in school, and they are more likely to go on to college and graduate school (Schachter, 1963). These findings are, of course, consistent with the assumption of higher aspirations (at least in the intellectual realm) for first borns. More data are clearly needed to buttress this point.

Let us now follow out some implications of the hypothesis that first borns have relatively unstable self-evaluations and, hence, a greater need for self-evaluation. While this need can to some extent be satisfied through impersonal transaction with the environment, Festinger (1950, 1954) has amply demonstrated that social interaction which permits interpersonal comparison is usually required. Other people, in effect, need to "tell" us what we are like. If first borns are more in need of this kind of information, they ought to be more dependent on others and should be more likely to seek out others when especially in need of self-evaluation. This is, of course, precisely the interpretative line that Schachter (1959) takes. Haeberle's (1958) research on dependence in children (cited by Schachter) supports this interpretation as do the many studies dealing with the relationship between birth order and affiliation (Gerard, 1963; Gerard and Rabbie, 1961; Radloff, 1961; Sarnoff and Zimbardo, 1961; Schachter, 1959; Zimbardo and Formica, 1963).

Our own experiment furnishes data congruent with these implications: we showed that first borns were more likely to evaluate themselves in terms of the behavior of others: that is, first borns seemed to be more socially responsive. This is the type of behavior we would anticipate if first borns are preoccupied, as we have asserted they are, with achieving self-evaluation. They need to pay attention to the behavior of others in order to evaluate themselves.

In this connection, the work of Stotland (Stotland & Cottrell, 1962; Stotland & Dunn, 1963; Stotland & Walsh, 1963) and his colleagues on birth order, self-esteem, and empathy becomes relevant. In general, they find first borns—surprisingly at first blush—to be less empathic than later borns, but explain this as being due to the fact that "The first and only borns . . . react as if they use the other person's performance level as a guide to self-evaluation, and do not really 'feel with' him [Stotland & Dunn, p. 539]."

Although Stotland and his associates do not explicitly discuss the relationship between birth order and self-esteem, we have already seen (see p. 19) that there is some evidence that first borns, on the average, are lower than later borns in self-esteem. Stotland and Dunn (1963) do comment, however, on the relationship between self-esteem and responsiveness:

> The finding that persons high in self-esteem [presumably mainly later borns—*our insertion*] empathize more than those who are low [presumably mainly first borns] suggest that highs have less need to be concerned with themselves and can 'lose themselves' more in other people. . . . Those high in self-esteem are not as influenced in their self-evaluation as the lows are. . . . The lows may be so concerned with their self-evaluation that they react to the experiences of others primarily in terms of its implication to themselves [p. 539].

So much (for now) for self-evaluation. How may we account for birth-order differences in anxiety and anxiety reduction?

[8] Zimbardo and Formica also conclude that the self-evaluations of first borns will be less stable, but their derivation is different and more ingenious: "A further assumption is that later borns use their older siblings, rather than their parents, as points of reference in evaluating their rate of physical development, opinions, abilities, and emotions. The inevitable conclusion is that the 'distant' comparison referents used by first-borns, being unrealistic, will lead them to unstable self-evaluation [p. 159]."

Here we are treading on much more speculative ground, and the following comments should be construed as representing little more than hunch and guesswork.

There are three principal questions that need to be faced here: (*a*) Why do first borns become more anxious than do later borns when confronting an anxiety-arousing situation (as Gerard & Rabbie, 1961; Schachter, 1959; and others have shown)? (*b*) Why does being with others in an unstructured situation raise anxiety for first borns, but result in essentially no change for later borns? (*c*) Why do later borns, but not first borns, especially like anxiety reducers? Because our answers will necessarily be speculative, they will be brief.

As to the first question, we would suggest that because anxiety reduction is more likely to be mediated by other persons (especially parents) for them (Schachter, 1959), first borns become less capable to cope with anxiety-provoking situations when on their own. Later borns, presumably, have more often to handle anxiety situations by themselves and thus are likely to develop more effective means to deal with them. We are proposing, obviously, that the greater dependence of first borns on others renders them less competent in these situations.

Turning now to the second question, one might make the following argument: because of their (hypothesized) relative inexpertise in coping with anxiety, first borns are highly responsive (possibly overresponsive) to situations which are potentially dangerous. This responsiveness leads them to be especially sensitive to the cues others give off concerning their emotional state. Being with others—despite the fact that others in the past have mediated anxiety reduction for them—might serve only to heighten a first born's sense of his own ineffectiveness. Zimbardo and Formica (1963), in fact, suggest that under the typical anxiety-arousing conditions of affiliation experiments, there is an ability dimension involved. Specifically: "*S* asks the question: 'Can I take whatever the experimenter has to give, and can I do this better than the others' [p. 160]." Following our reasoning, we would have to say that first borns should be expected more often to answer in the negative.

Before tackling the last question, we must pause to consider the conflicting findings of the Wrightsman experiment. It will be recalled (see p. 15) that Wrightsman found that waiting with others actually reduced anxiety for first borns. While one could point to such obvious differences between the two experiments as initial level of anxiety (in Wrightsman's experiment it was lower), subject composition (Wrightsman used both males and females; sex differences are denied, but no data are presented), the nature of the waiting-period conversation (uncontrolled in Wrightsman's experiment), etc., none of these factors would in themselves seem to account for the discrepancies. Even in the control conditions which are most nearly comparable to his, the birth-order trends of the two studies are still quite divergent. While it is true that our *N*s in these conditions are smaller than his and that none of our control-group differences is actually statistically significant, that is not so for the experimental conditions (combined) where the differences between the two experiments are indeed most marked.

Clearly these discrepant findings are still in need of a satisfactory explanation. Since it makes a considerable difference, in terms of the theory developed in this paper, whether the presence of others is anxiety arousing or anxiety reducing for first borns, we urgently need further investigations which study the consequences of affiliation for first borns and later borns and relate them to the conditions under which affiliation occurs.

Finally, why are anxiety reducers especially liked by later borns, while first borns show no preference between anxiety raisers and anxiety reducers? The most parsimonious explanation for the data from this experiment is simply to say that, while first borns sometimes declined in anxiety (more exactly, increased in calmness), none of them ever became *very* calm (see p. 17): that is, their anxiety wasn't reduced enough to make a difference. Why a first born

should be so resistant to anxiety reduction we have tried to indicate in the preceding pages.

These speculations concerning birth-order differences in anxiety and anxiety reduction have (possibly as their only merit) testable consequences and need to be assessed before we can incorporate them into a theory concerned with birth-order differences and social behavior.

Some Unsettled Issues

We shall conclude with a few comments on three important issues whose implications we have heretofore considered only by allusion, if at all. These comments may be taken as indicating some possible directions for further research in this area.

First, there is the question of the generality of the self-evaluative need. We have repeatedly found evidence against a generality hypothesis even within the limited range of characteristics studied in this investigation. Yet we have indicated that there is some reason to question this interpretation[5, 6] and to consider the matter still an open question.[9] Certainly the theory presented would imply that the need should not necessarily be specific only to certain evaluable aspects of oneself (e.g., ability factors), but rather should be operative with respect to many domains of a person's make-up. The evidence from the literature on this point, while suggestive, is far too fragmentary to warrant any conclusion, even a tentative one.

Another issue concerns a possible interaction between sex and birth-order variables. Our theory is meant to apply to persons of either sex, yet all our *S*s were females. May we glibly assume that the sex of a person contributes only an insignificant proportion to the variance of behavior stemming from self-evaluative needs?

Although the data are not at all consistent on this point, there have been reports of some Sex × Birth Order interactions. For example, Gerard and Rabbie (1961) found the usual relationship among birth order, anxiety arousal, and affiliation for females but quite the opposite for males (i.e., later-born males appeared more anxious and showed stronger affiliative tendencies). The same Sex × Birth Order interaction was found for affiliative tendencies in a subsequent experiment by Gerard (1963). In an unpublished study by Farina, Ring, and Weller (1963),[10] the same tendencies were revealed through questionnaire responses. For example, in reply to the question: "When you are upset, do you tend to: (*a*) go off by yourself or (*b*) seek out other people," we found that while significantly more ($p < .05$) of the first-born females said they would affiliate (68% to 47%), just the reverse was true for males (28% for first borns, 46% for later borns). Comparing affiliative tendencies of first-born males with first-born females (28% versus 68%), the difference was significant at beyond the .0005 level by a chi-square test.

Plausible explanations for such Sex × Birth Order interactions have been offered (e.g., Gerard & Rabbie, 1961), but it is difficult to evaluate them until the conditions under which these interactions take place can be specified (for some investigators, including Schachter, find parallel results for both sexes). Our own suggestion would be that while tendencies toward self-evaluation should be the same for both sexes, there may be certain circumstances where other competing motivations take precedence for one sex but not for the other (e.g., possibly first-born males are more reluctant to show fear in front of others and thus seek *not* to affiliate under such conditions). The research question is, of course, what motivations and under which conditions?

Finally, we would make a plea: almost

[9] One way to investigate the generality of the self-evaluative need within the area of emotionality would be to reanalyze the results of the Schachter and Singer (1962) experiment dealing with determinants of emotional state according to the ordinal position of the *S*s. Since different emotional states were manipulated in their study (viz., euphoria and anger), we would have to predict that, if self-evaluative needs are generalized over different emotional states, first borns should show a greater tendency to emulate the behavior of the (emotional) stooge than later borns.

[10] Unpublished study entitled "Some correlates of ordinal positions"; available from author.

all investigators seem agreed that birth-order differences reflect certain constants in the childhood experiences of first borns and later borns, and yet there has been a curious disinclination, among social psychologists at least, to study children in this regard (so far we must apply this stricture to ourselves as well). It seems evident, however, that we shall soon reach a theoretical impasse without this type of research. The most speculative parts of our theory, to take one example, are speculative precisely because we lack the specific information on children that we need. It seems to us, then, that further theoretical advances in this intriguing area hinge most closely on direct, theoretically oriented investigations of children, both within and outside of the laboratory. If this sounds as if we are saying that social psychologists need to become child psychologists as well, that is probably because that is exactly what we are saying.

SUMMARY

This investigation was conducted to test the hypothesis that first-born individuals have a greater need for both self-evaluation and anxiety reduction than later borns. The experimental design was a 2 × 2 × 2 factorial with (*a*) opportunity for anxiety reduction and (*b*) ease of self-evaluation, the experimentally manipulated variables, and (*c*) ordinal position of birth the third variable. Only female *S*s were run. An experimental session involved one naive *S* and two experimental confederates. *S* was told that she and the other girls would shortly be taking part in an experiment concerned with "auditory stimulation," but that it would first be necessary that everybody fill out a "mood" questionnaire purportedly relevant to the experiment soon to begin. On a pretext, *E* soon thereafter left the room for 5 minutes following which the two confederates conversed in such a way as to suggest their emotional state (high or low in anxiety) and their degree of similarity of emotional state (high or low). After this 5-minute interlude, *E* returned, administered some additional questionnaires, and then informed the naive *S* of the true purpose of the experiment. (There was no "auditory stimulation" experiment.)

The major findings of the experiment may be summarized as follows:

1. Being with others in an ambiguous, possibly dangerous, situation is anxiety arousing for first borns, not so for later borns.

2. In general, changes in the emotional state of first borns seem to depend on the nature of the social environment to a much greater extent than is true for later borns; specifically, first borns show stronger tendencies than later borns to converge toward the emotional level of others.

3. First borns tend to like those who are similar (on an emotionality dimension) to themselves, whereas later borns tend to like those who decrease their anxiety level.

4. First borns are less confident about their self-ratings on emotionality dimensions; their self-ratings also show greater fluctuations than those of later borns.

The major results of the experiment were interpreted as reflecting a greater need for self-evaluation on the part of first borns, but a greater need for anxiety reduction in the case of later borns. A developmental theory which concerns itself with motivation and social behavior in relation to birth order and which attempts to integrate findings from a number of studies was presented.

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